History of the Department of Entomology University of Hawaii, College of Tropical Agriculture[1,2]

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UNIVERSITY OF HAWAII, HONOLULU, HAWAII

The University of Hawaii is the principal institution of higher learning in the State of Hawaii. It is a land grant institution, founded in 1907 by the Territory of Hawaii Legislature under the provisions of the Morrill Act of 1862 and subsequent legislation. Originally called the College of Hawaii or the Hawaii College of Agriculture and Mechanical Arts, the University was given its present name in 1920.

Instruction began in 1908 at the present site of Linekona School between South King and Beretania Streets near Thomas Square. Permanent buildings were constructed and ready for occupancy on the present site in Manoa Valley in 1912.

Today, the university embraces seven colleges, a graduate division and a research division. The colleges are Arts and Sciences, Business Administration, Education, Engineering, General Studies, Nursing and Tropical Agriculture. Graduate study programs in all departments are organized under the Graduate Division. Various research grants and contracts are supervised by the Research Division.

Bachelor degrees are awarded in 60 major fields of study, master degrees in 63 disciplines and doctorate degrees in 21.

Also, on the campus are the buildings of the East-West Center (formerly called the Center for Cultural and Technical Interchange Between East and West), a project of the federal government operated in association with the University of Hawaii.

Through cooperative agreements with a number of private, state and federal institutions, the University has expanded its research facilities and its services to the state. Some of the cooperating institutions are the Bernice P. Bishop Museum, Hawaiian Sugar Planters' Association, Pineapple Research Institute, Honolulu Academy of Arts, Pacific and Asian Affairs Council, Hawaii Department of Agriculture, U. S. Department of Agriculture Fruitfly Laboratory and the U. S. Department of Interior's Honolulu Biological Laboratory of the Bureau of Commercial Fisheries of the Fish and Wildlife Service. Also, the University jointly uses astronomical observatory facilities at Haleakala Maui, with the University of Michi-

[1]Presidential address presented at December, 1965, meeting of the Hawaiian Entomological Society.

[2]Published with the approval of the Director of the Hawaii Agricultural Experiment Station as Miscellaneous Paper No. 193.

gan. Additional facilities are being constructed on Mauna Kea, Hawaii. Occasionally the facilities of the Volcano Observatory of the U. S. Geological Survey on Mauna Loa, Hawaii are used by university scientists. These institutions have encouraged the development of the University from the very beginning and have added greatly to the research and academic programs over the years. Scholars from these institutions are often called upon for seminars and consultations, and are part of the Affiliate Graduate Faculty.

The history of the Entomology Department is divided into teaching and extension. History of the research programs of the Hawaii Agricultural Experiment Station will not be included but will be published separately.

INSTRUCTION IN ENTOMOLOGY

Entomology has had its place in the history of the University from the very outset. The Prospectus of the Hawaii College of Agriculture and Mechanical Arts in 1908 listed entomology as a course in the junior year. Courses in Horticulture included sections on the spraying of insecticides and fungicides for insect and disease control.

Tuition was free for residents of Hawaii. To enroll, a student had to be at least 15 years old, of good moral character, and of good health. He had to present evidence of scholarship such as a high school diploma or its equivalent, or a normal school diploma, or by passing an examination on general subjects such as English Grammer, U.S. History, Hawaiian History, Reading, Writing, Spelling, Arithmetic and Geography.

The College of Hawaii offered instruction in four fields: Science, Agriculture, Engineering and Household Economics. The complete course required four years. Entomology was offered in all fields except Engineering. Classwork began on Monday, 14 September 1908, with 10 students (5 regular and 5 preparatory).

In 1908–1910, special lectures on entomology were given by Jacob Kotinsky (Fig. 1), assistant entomologist of the Territorial Board of Agriculture and Forestry, in addition to the regular instruction. He was appointed Chief Plant Inspector, Superintendent of Entomology and Territorial Entomologist from 28 June 1908, after the death of Alexander Craw, until 1 October 1909, when Edward M. Ehrhorn arrived. Kotinsky was a charter member of the Hawaiian Entomological Society and served as the first Secretary-Treasurer. Lectures and demonstrations both in the afternoon and evening were given yearly. Mr. Kotinsky's subjects were Methods and Results of Inspection, Our Insect Friends, and Our Insect Enemies.

Dr. Henry H. P. Severin (Fig. 2) was employed as professor of entomology from 1910–1912. He taught the first formal course in entomology, Entomology 2. This course consisted of lectures on the characteristics of orders, suborders, and the more important families of insects with special

Fig. 1. Jacob Kotinsky(1873–1875)
First Lecturer in Entomology (BEPQ Photo)

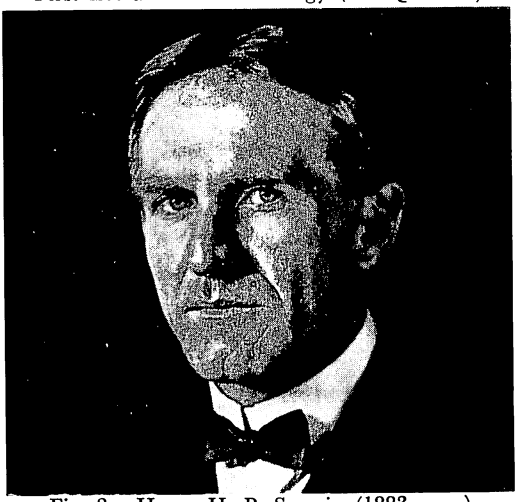

Fig. 2. Henry H. P. Severin (1883–)
First Professor of Entomology (BEPQ Photo)

reference to the injurious and beneficial species and methods of insect pest control, Laboratory work included the study of structure of insects and practice in their classification. Lectures and laboratories could be taken independently. The first annual commencement of the College of Hawaii in 1912 consisted of four students, of which William John Hartung was the

first to receive a Bachelor of Science degree in entomology. He returned to California and published many papers with Severin on leafhoppers and their control and disease transmission. Miss Louise Gulick, who graduated at that time with a Bachelor of Science degree was interested in entomology also. She published a paper entitled, "Synoptic List of Ants Reported from the Hawaiian Islands" in the Proceedings after graduation. Professor Severin had six students in entomology. He expressed the need for furniture and space and requested an expenditure of $500 to build an apiary and laboratory. The Board of Regents approved his request.

Upon the resignation of Prof. Severin, the Board of Regents authorized the hiring of Dr. James F. Illingworth (Fig. 3) on 7 October 1912, as professor of entomology at $2,400 per year. He requested a raise two years later, stating that when he accepted the position it was understood the salary would be increased to $3,000. The Board of Regents gave him a raise of $300 in 1914. Dr. Illingworth formulated the general requirements for a master's degree in entomology, namely, satisfactory pursuance of advanced work under the direction of a special committee, for at least one year at the college or two years in absentia. Nature of the work would be restricted to one major and one or two minor subjects. Entomology was considered a division. He taught four entomology courses in

Fig. 3. James Franklin Illingworth (1870–1949)
Formulated requirements for graduate study (BEPQ Photo)

1913 and 1914-General Entomology, Elementary Systematic Entomology, General Economic Entomology and Research in Economic Entomology. He realized the opportunities for research in this field. In 1914 the discipline of sugar technology was added to Agriculture, Civil and Mechanical Engineering, General Science and Household Economics. This same year Prof. Illingworth added Elementary Morphology of Insects, Economic Entomology of Sugar Cane, Domestic Entomology, Entomological Literature and Apiculture to the curricula. An insectary was built at the cost of $500 to house the honey extracting equipment and to rear insects for biological studies. The university had over 100 bee colonies donated by E. C. Smith, manager of the Garden Island Honey Company. Such donations materially aided instruction and research in entomology.

At commencement in June, 1914, Alfred Warren received the school's first Master of Science degree. The degree was awarded in entomology. His thesis was entitled "A Study of the Food Habits of the Hawaiian Dragonflies or Pinau with Reference to Their Economic Relation to the Rest of the Insect Fauna". Illingworth was chairman of his committee.

A leave of absence was granted Illingworth in 1917 so that he could accept a 3-year appointment with the Queensland, Australia, government as an entomologist to combat sugar cane pests. In 1919 Professor Illingworth resigned from the college to remain in Australia for several additional months. While on the college staff he published several papers on economic entomology.

David L. Crawford (Fig. 4) was appointed Professor of Entomology in 1919 and remained in this position until 23 December 1926 when he became president of the University of Hawaii. The only change in the curricula in 1919 was the combining of Domestic and Household Entomology into Medical Entomology which emphasized insects that attack man and their control measures. Apiculture was given as a noncredit short course every spring. The apiary work was under the direction of E. C. Smith. Professor Crawford was primarily interested in insect taxonomy (Psyllidae) and economic entomology. He helped develop the extension service and served as its director from 1921–26. He coached the football team in 1919, and his wife directed the Glee Club. He received an honorary LL.D. degree from his alma mater, Pomona College, in 1934 and in gratitude for his services in teaching, extension and administration the University of Hawaii, also, conferred an honorary LL.D. on him in 1957.

In 1920 the University received its present name and was divided into two colleges, the College of Applied Science and the College of Arts and Sciences. The College of Applied Science offered courses in agriculture, engineering, sugar technology, home economics and general science. General Science was divided into the physical and biological sciences, the latter division including entomology, botany and zoology. Ento-

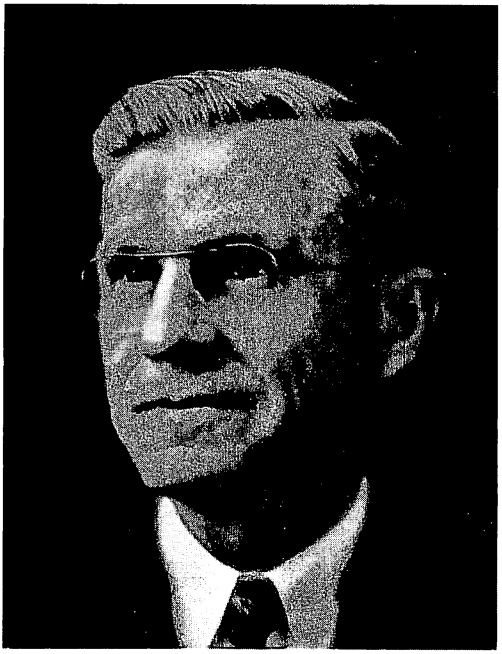

Fig. 4. David Livingston Crawford (1889–)
Professer of Entomology-President, University of Hawaii, 1926 to 1941

mology courses were required in Agriculture, Sugar Technology, Home Economics and General Science. In the College of Arts and Sciences entomology was required in the pre-medical course. The courses, General Entomology, Insect Taxonomy, Economic Entomology, Economic Entomology of Sugar Cane, Insect Morphology, Medical Entomology and Research in Economic Entomology remained relatively unchanged and were taught by Crawford until 1925.

Edwin H. Bryan, Jr., who received his master's degree in entomology under Crawford in 1924, was employed as an instructor in entomology and taught the general and economic courses. When Dr. Crawford became president of the university, Bryan continued as instructor in entomology, teaching all courses. The Entomology Seminar was established by him in 1928. It included special problems in entomology and was open only to students capable of advanced study. All courses in entomology were listed under Zoology and remained there from 1930 to 1960 when Entomology once again became a separate department academically as well as in research. He published many papers on natural history of the Pacific islands. He had been on the staff of the Bishop Museum since 1919 and gave up teaching entomology in 1929 to work full time for the museum.

From 1929 through 1931, Merril K. Riley, an instructor in the

Zoology Department, taught entomology. The number of courses was reduced to General Entomology and Economic Entomology. Riley later joined the Extension Service and was a county agent for many years. O. Wilford Olsen, instructor of zoology and entomology, assisted with teaching duties in 1931. They separated general entomology lecture and laboratory. Entomology courses were increased in 1933 and were listed as General Entomology, Agricultural Entomology (Economic), Insects Affecting the Health of Man and Domestic Animals (Medical), Agricultural Entomology Laboratory, Insect Morphology and Systematic Entomology.

The Graduate School of Tropical Agriculture was established in 1931 to provide facilities for research and graduate training in the several branches of science pertaining to tropical agriculture. To provide the best training and equipment possible, instructors from several research organizations in Honolulu joined the university in cooperative union, each providing certain facilities. Dr. Royal N. Chapman, director of the Experiment Station of Hawaii Pineapple Canners (Pineapple Research Institute), was appointed dean of the new school. The graduate faculty in the field of Entomology included Dr. Chapman, Dr. Walter Carter (Fig. 5), Otto H. Swezey (Fig. 6), and Cyril Eugene Pemberton (Fig. 7). These men remained on the graduate faculty for many years. In appreciation of their faithful service, the University of Hawaii award-

Fig. 5. Walter Carter (1897–) Senior Scientist, PRI
First Professor Emeritus in Entomology

Fig. 6. Otto Herman Swezey (1869–1959)
Honory D. Sc. 1944. Entomologist with HSPA

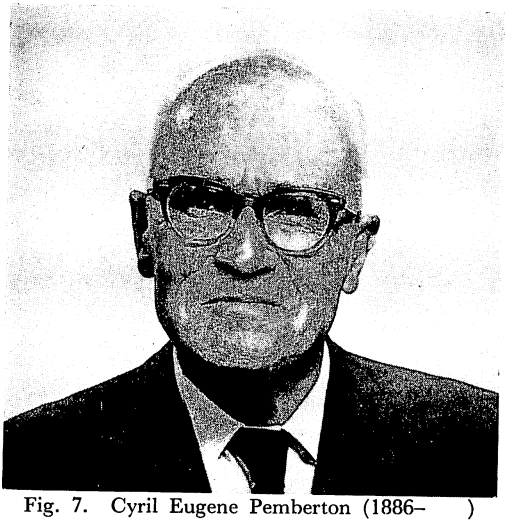

Fig. 7. Cyril Eugene Pemberton (1886–)
Honorary D. Sc. 1951. Entomologist with HSPA

ed Honorary Doctor of Science degrees to Swezey in 1944 and Pemberton in 1951 and made Dr. Carter Professor Emeritus of Entomology in 1962. Dr. Pemberton is still called upon to give lectures and seminars on Hawaiian Entomology.

Students in the graduate School of Tropical Agriculture were candidates for advanced degrees, research fellows (not seeking a degree) or special students. Requirements for a doctorate included 3 years in residence with at least one year at the University of Hawaii. The candidate must pass a qualifying general examination at least one year prior to awarding the degree. The qualifying examination included a test of reading knowledge of both French and German. One was not a formal candidate until the language examination was passed. Eight graduate students in entomology were registered in 1931.

Graduate courses in entomology were established in the Graduate School of Tropical Agriculture in 1933. Research in Entomology (Carter and Chapman), Insect Ecology (Chapman) and a Review of the Role of Insects in Transmission of Plant Diseases (Carter) were developed and are still being offered to graduate students in entomology.

At commencement the same year, the first Doctor of Philosophy degree (Entomology) conferred by the University of Hawaii was presented to John Sydney Phillips whose program was under the direction of Dr. Carter. His dissertation was entitled, "The Biology, Distribution and Control of Ants in Hawaiian Pineapple Fields". Dr. Carter reported Phillips to be an extraordinary person since he wrote his final examination in rhyme. Upon completion of his doctorate he was employed by Lever Brothers, on a coconut plantation in the Solomon Islands. With the onset of World War II, he returned to England and taught for a period of time. He passed away in the late 1940's.

Carl Schmidt received his doctorate degree from the university in 1934 and was hired immediately as teacher of entomology. He added two new courses to the curricula. Principles of Applied Entomology was a survey course of the problems in economic entomology from the standpoint of history as well as the most recent advances. Because of the need for trained men in plant quarantine a course in Plant Quarantine and Inspection was given by David T. Fullaway (Fig. 8). Fullaway was chief plant inspector and entomologist in charge of Entomology and Plant Quarantine for the Territory of Hawaii Board of Agriculture and Forestry. He continued the course through 1948. For his faithful service and in appreciation of his contributions to entomology in Hawaii, the university conferred an Honorary Doctor of Science degree on him in 1962. In addition to the regular classwork, Dr. Schmidt lectured on the Principles of Applied Entomology to adult education evening classes and continued giving entomology courses until 1936 when he resigned to go on an expedition to Brazil.

For the next two years (1936 and 1937) Fullaway, Swezey, and Elwood C. Zimmerman were appointed lecturers on entomology and assisted the Department of Zoology staff with the undergraduate courses. Graduate courses were still being offered.

Fig. 8. David Timmins Fullaway (1880–1964)
Honorary D. Sc. 1962. Chief Plant Inspector

In 1937 Dr. Frederick G. Holdaway was appointed assistant professor of entomology and zoology at the university and entomologist for the Hawaii Agricultural Experiment Station. He was made part of the graduate faculty along with Carter, Pemberton, Schmidt and Swezey. The curricula remained much the same although Thesis Research was added in 1937. Dr. Holdaway taught the Principles of Applied Entomology to adult education classes for the last time in 1937.

Chester B. Keck was appointed lecturer in entomology in 1939 to give a course in apiculture. At this time Dr. Holdaway gave the undergraduate courses of General Entomology, Agricultural Entomology, Insect Morphology, Systematic Entomology, Insect Ecology and Principles of Applied Entomology. Joseph Alicata lectured on Medical and Veterinary Entomology and Fullaway continued to offer his course, Plant Quarantine and Inspection. Elwood C. Zimmerman gave the courses, Insect Morphology and Systematic Entomology, in 1940. Graduate credits were given in courses offered by Carter and Holdaway.

The number of students reduced considerably with the outbreak of World War II in December, 1941. Classes were closed for two months. With the advent of victory gardens, a number of publications on garden insect control were published by the entomology staff. Dr. Holdaway continued to give the general courses and Fullaway continued his course. During this period, the entomology courses were reduced to the basic needs.

Dr. Dilworth D. Jensen was appointed assistant entomologist and assisted Dr. Holdaway in giving the general and economic entomology

courses in 1945.

The present College of Tropical Agriculture was formed in 1947 with the integration of the Agricultural Extension Service and the Agricultural Experiment Station. The university then, consisted of five colleges: Arts and Sciences, Applied Science, Agriculture, Teachers College and the Graduate Division. The academic staff in entomology consisted of Holdaway, Carter, Fullaway and Dr. Leonard D. Tuthill who taught General Entomology, Insect Morphology, Systematic Entomology and Preparation of Scientific Manuscripts. Agricultural Entomology, Insect Ecology and Principles of Applied Entomology were given by Holdaway. Dr. Carter and Mr. Fullaway continued with their specialties. Entomology Seminar and Directed Research were handled by the staff. Dr. Holdaway resigned in 1948 and moved to the University of Minnesota.

Dr. Tuthill acted as chairman of entomology for a few months until Dr. Henry A. Bess arrived in late 1948. Appointed in July, 1948 to do taxonomic studies of fruit flies and to teach entomology, Dr. D. Elmo Hardy, in 1949, began Medical and Veterinary Entomology and alternated with Dr. Tuthill in General Entomology. Dr. Tuthill taught Insect Morphology, Systematic Entomology and established a new course in Advanced Systematics. Insect Ecology and Principles of Applied Entomology were taught by Dr. Bess. Dr. Carter continued with his course, Insect-transmitted Diseases of Plants.

Dr. Martin Sherman arrived in 1949 and started teaching Economic Entomology the following year. Three new courses—Scale Insects, Biological Control of Pests and Advanced Economic Entomology were added to the curricula in 1950. Dr. Walter H. Wellhouse became the first visiting professor in entomology in 1950. He arrived to give the courses for Dr. Tuthill who was on a Fullbright Fellowship in New Zealand. Dr. Wellhouse taught Insect Morphology and General Entomology. Scale Insects, offered by Dr. Hardy, emphasized the field and laboratory techniques for collecting, mounting scales, taxonomy, economic importance and control. Biological Control of Pests, given by Dr. Bess, dealt with the fundamental concepts of biological control and the problems involved in the introduction of beneficial enemies of insect and weed pests. Advanced Economic Entomology, taught by Dr. Sherman, dealt with the principles and problems involved in chemical control of insect pests. Studies in insect toxicology and physiology in respect to the use of insecticides in the control of insect pests were emphasized. The three courses are being offered at the university, but the course in Advanced Economic Entomology is now Insect Toxicology.

Acarology, a course in the biology, structure and classification of mites, was offered for the first time in 1952 by Dr. Irwin M. Newell. Dr. Newell resigned in 1956 to accept a position with the University of California at Riverside. Dr. Russell W. Strandtmann, acarologist of the Bishop Museum

staff, was appointed lecturer in entomology for the spring semester of 1963. Dr. Frank H. Haramoto, who teaches the course now, supervised the laboratory sections for Dr. Strandtmann.

The course in Principles of Insect Pathology was started in 1954 by Dr. Yoshinori Tanada and included studies of diseases of insects, histopathology, microbial agents and biological control. Dr. Tanada resigned in 1956 and moved to the University of California at Berkeley. Dr. Tamashiro now teaches the course.

A new course, Insect Life, was taught by Tuthill for two years (1955–1957). It was a general study of insects and related arthropods, emphasizing the natural history of local forms.

In 1958 Dr. Hardy was appointed chairman of the Department of Entomology of the Hawaii Agricultural Experiment Station. Instruction remained in the Department of Zoology. Entomology separated from zoology and became a department for instruction and research in the College of Tropical Agriculture in 1960. The most recent course added (1960) to the curricula was Immature Insects. It features the identification, structure, literature and economic significance of immature forms. Emphasis is placed on the Holometabola. The course was introduced by Dr. Dale H. Habeck who resigned in 1962 to go to the University of Florida at Gainesville. This and Scale Insects courses are now taught by Dr. J.W. Beardsley.

In 1961, the first scholarship recipients from the East-West Center arrived to begin graduate study in entomology. Our first students under these grants were Miss Shuch-shiang Huang of Formosa and Mr. Takashi Ishii of Japan. Since then, we have accepted grantees from the

COURSES OFFERED BY DEPARTMENT OF ENTOMOLOGY, UNIVERSITY OF HAWAII

Undergraduate Courses:	COURSE	INSTRUCTOR
161	General Entomology	Hardy, Mitchell
361	Insect Morphology	Namba
362	Systematic Entomology	Hardy, Beardsley, Tuthill
372	Economic Entomology	Sherman, Mitchell
399	Directed Research	Staff

Graduate Courses:	COURSE	INSTRUCTOR
661	Medical and Veterinary Entomology	Hardy
662	Advanced Systematic Entomology	Beardsley, Hardy, Tuthill
663	Scale Insects	Beardsley, Hardy
664	Immature Insects	Beardsley
671	Insect Ecology	Bess, Nishida
672	Acarology	Haramoto
673	Insect Pathology	Tamashiro
675	Biological Control of Pests	Bess, Nishida
680	Insect Toxicology	Sherman
686	Insect-transmitted Diseases	Namba
697	Entomology Seminar	Staff
699	Directed Research or Reading	Staff

An undergraduate course in General Entomology offered at the Hilo, Hawaii, Branch of the University is taught by Dr. HAROLD Little, assistant professor of biology.

Philippines, Japan, Formosa, Malaysia, Thailand, Burma, Ceylon, India, Pakistan and New Zealand. Graduate students have come also from the Trust Territory of the Pacific, Mexico and the United States.

GRADUATE STUDY PROGRAMS

The general requirements for admission to graduate school and advanced degrees are given in the University of Hawaii, Graduate School Bulletin. The specific requirements for admission to candidacy for advanced degrees in entomology are listed below.

1. An individual intending to work for an advanced degree must submit a formal application and official transcripts of previous undergraduate and graduate studies to the Dean of the Graduate Division.

2. Students must have at least 18 semester hours of undergraduate credit with grade of B or better in zoology and entomology, including general zoology, general entomology, insect morphology and systematic entomology. Two years of chemistry (inorganic and organic), one year of physics and courses in algebra, botany and genetics are required. Candidates deficient in the basic requirements will be deferred from candicacy without prejudice until the requirements have been met. Foreign students are required to pass an English examination, as a second language, and have a statement of financial support.

3. Advanced degree candidates must maintain an all graduate-school, grade average of B or better.

4. Requirements for Master of Science Degree (M.S.)

Plan A. Thesis Program:

A minimum of 24 semester credit hours of course work and 6 hours of thesis research is required. The minimum residence requirement is two semesters of full-time work and all work must be completed within seven years preceeding the date upon which the degree is conferred. A thesis is required and all degree candidates must take a general qualifying examination (diagnostic in nature and usually given the first semester) and must pass a comprehensive examination and a final oral examination on the thesis and related material after the study has been completed.

Plan B. Non-thesis Program:

A minimum of 30 semester credit hours of course work is required. The minimum residence and time limitations are the same as for Plan A. All candidates must take the general qualifying examination and in addition pass an oral comprehensive examination or make a seminar appearance near the conclusion of their program at which time they will be examined by the program committee.

5. Requirements for Doctor of Philosophy Degree (Ph. D.)

A minimum of 72 semester credit hours is required. Twelve hours of credit must be in a field, or fields of study other than the major. A reading knowledge of two foreign languages, chosen by the thesis committee, is required. Minimum residence requirement is six full semesters in graduate study with at least three in residence at the University of Hawaii.

The doctoral dissertation is required and it should be a scholarly presentation of an original contribution to knowledge based on independent research. The dissertation should be suitable for publication in whole or in part.

All candidates must take the general qualifying examination shortly after arriving on the campus. Certification of proficiency in one of the foreign languages is required for admission to candidacy. Certification of proficiency for both foreign languages approved by the committee is required before the candidate can take the comprehensive examination. The comprehensive examination is both oral and written and covers the major and related field or fields of study. It is usually given after the candidate has completed the prescribed course work. Finally the student must present a dissertation combining original research, scholarly analysis and presentation, and defend his thesis in a final oral examination.

The number of graduate students in entomology working for advanced degrees since 1951 are shown in Table 1.

Table 1.

Academic Year		Degree	
Fall	Spring	M.S.	Ph.D.
1951	1952	3	4
1952	1953	4	2
1953	1954	3	1
1954	1955	2	1
1955	1956	2	1
1956	1957	2	3
1957	1958	2	3
1958	1959	4	3
1959	1960	4	3
1960	1961	7	5
1961	1962	7	4
1962	1963	11	6
1963	1964	19	8
1964	1965	23	6
1965	1966	24	8

The Department of Entomology to date has awarded 11 doctorate and 42 master's degrees. Table 2 lists the recipients.

Table 2.

Doctorate Degrees (Ph.D.):		
Year	Conferee	Dissertation
1933	John Sydney Phillips (B.S. 1925; M.A. 1930; M.S. 1931 Oxford Univ.)	The Biology, Distribution, and Control of Ants in Hawaiian Pineapple Fields
1934	Carl Theodore Schmidt (B.A. 1929 Minnesota Univ.)	A Biological Study of Nitidulid Beetles Found in Pineapple Fields.
1954	Jit Singh Verma (B.S. 1949 Agra Univ.; M.S. 1951 Agra Univ.)	A Comparative Study of the Bionomics of *Peregrinus maidis* (Ashmead) and Its Egg Predator, *Cyrtorhinus mundulus* (Breddin) and the Toxicity of Several Contact and Systemic Insecticides to the Two Species

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Table 2 (cont.)

Year	Conferee	Dissertation
Doctorate Degrees (Ph.D.):		
1960	Alden Dexter Hinckley (B.A. 1953 Harvard College; M.S. 1956 Univ. Hawaii)	Mortality of Two Beetles, *Araecerus livipennis* Jordan and *Mimosestes sallari* (Sharp), in Field Populations
1960	Elizabeth Anne McMahan (B.A. 1946, M.S. 1948, Duke Univ.)	Laboratory Studies of *Cryptotermes brevis* (Walker) (Isoptera: Kalotermitidae) With Special Reference to Colony Development and Behavior
1963	John Wyman Beardsley Jr. (B.S. 1950 Univ. Calif.: M.S. 1952 Univ. Hawaii)	The Coccidea of Micronesia (Homoptera)
1965	Fernando F. Sanchez (B.S. 1949 Univ. Philippines; M.S. 1962 Univ. Hawaii)	Factors Affecting the Latent Toxicity of Aldrin, DDT and Heptachlor to Resistant and Susceptible Strains of the House Fly
1965	Mervyn Arthur Kamran (B.S. 1957; M.S. 1959 Univ. Punjab)	Ecological Studies on *Polydesma umbricola* Boisduval in Hawaii. (Lepidoptera: Noctuidae)
1966	Frank Hiroshi Haramoto (B.S. 1949; M.S. 1953 Univ. Hawaii)	Biology and Control of *Brevipalpus phoenicis* (Geijskes) (Acarina:Tenuipalpidae)
1966	Benjamin David Perkins (B.A. 1958 Univ. Richmond; M.S. 1960 Virginia Polytechnic Institute)	Status and Relative Importance of Insects Introduced to Combat Lantana
1966	Mercedes Delfinado (B.S. 1955 Univ. Philippines; M.S. 1960 Cornell Univ.)	A Revision of the Culicine Mosquitoes of the Philippines, Tribe Culicini (Diptera: Culicidae)
Master of Science Degrees (M.S.):		
1914	Alfred Warren	A Study of the Food Habits of the Hawaiian Dragon Flies with Reference to Their Economic Relation to the Rest of the Insect Fauna
1924	Edwin Horace Bryan Jr.	Diptera of Hawaii. A Systematic Account of the Two-winged Flies Recorded from the Hawaiian Islands, with Keys, Bibliography and Description of Species
1931	Josias Christian le Roux	A Study of the Soil Fauna Encountered in Pineapple Cluster Plantings
1934	Spencer Tinker	Coleoptera of Washington-Cerambycidae
1934	Won Yill Whang	The Control of Pineapple Mealy Bug., (*Pseudococcus brevipes* Ckl.) in Pineapple Breeding Material
1934	Ralph H. Marlowe	The Toxicity of Various Nicotine Derivatives of the Adult *Ceratitis capitata* Wiedman
1936	Kiyoshi Ito	Biological Studies of the Pineapple Mealy Bug, *Pseudococcus brevipes* (Ckl.)
1936	Amy Suehiro	A Revsion of the Genus *Pseudococcus* in the Hawaiian Islands
1936	Frank Tadao Kitamura	The Influence of Host Sequence on Efficiency of *Thrips tabaci* Lindeman as a Vector of Yellow Spot Virus of Pineapple

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Table 2 (Cont.).

Master of Science Degrees (M.S.):		
Year	Conferee	Dissertation
1945	Yoshinori Tanada	Feeding Habits of the Tomato Bug, *Cyrtopeltis varians* (Distant), with Special Reference to the Feeding Lesion on Tomato
1947	Toshiyuki Nishida	The Life History and Ecology of the Garden Fleahopper, *Leucopoecila albofasciata* Reuter
1950	Ellery Walter French	A Study of the Biology and Morphology of *Achaea janata* (Linn.), a Catocaline Moth, as It Occurs in Hawaii
1952	John W. Beardsley, Jr.	A Fungus Parasite of *Coccus viridus* (Green) in Hawaii
1953	Frank Hiroshi Haramoto	The Biology of *Opius oophilus* Fullaway (Braconidae: Hymenoptera)
1954	Donald P. Wilton	A Study of a Blowfly, *Chrysomia rufifacies* (Macquart), with Special Reference to Its Reproductive Behavior. (Diptera: Calliphoridae)
1954	Minoru Tamashiro	The Toxicity of Insecticides to Larvae of the Oriental Fruitfly, *Dacus dorsalis* Hendel, and its Parasite, *Opius oophilus* Fullaway
1956	Alden Dexter Hinckley	The Wasp, *Trichogramma minutum* Riley, as an Egg Parasite of the Moth, *Cactoblastis cactorum* (Berg)
1958	Donald Awai	A Study of the Identity, Larval Stages, and Natural Enemies of *Hellula undalis* (Fabricius) (Lepidoptera: Pyralididae) in Hawaii
1961	Alvin Masaki Tanabe	The Biology and Pathogenecity of a Microsporidian Parasite of the Cabbage Looper, *Trichoplusia ni* (Hübner) (Lepidoptera: Noctuidae)
1961	Hachiro Harold Toba	Life History Studies of the Vector *Myzus persicae* (Sulzer) (Homoptera: Aphididae) and Its Transmission Relationships with the Watermelon Mosaic Virus
1962	Kazuhiko Ando	The Relative Susceptibility of the Larvae of *Spodoptera mauritia acronyctoides* (Guenée) (Lepidoptera: Noctuidae) to Several Contact Insecticides
1962	Asher K. Ota	A Biological Study of *Phytobia* (*amauromyza*) *maculosa* (Malloch) (Diptera: Agromyzidae).
1962	Fernando F. Sanchez	Toxicity of Insecticides to *Cryptophlebia illepida* (Butler), a Pest of Macadamia
1963	Carl J. Mitchell	A Study of Population Structure and Dynamics of the Rat Mites *Laelaps* (*Echinolaelaps*) *echidninus* Berlese, 1887, and *Laelaps* (*Laelaps*) *nuttalli* Hirst, 1915
1964	Takashi Ishii	Resistance and Cross-resistance of the German Cockroach, *Blatella germanica*(L.), to Insecticides

—— continued ——

Table 2 (Cont.).

Master of Science Degrees (M.S.):		
Year	Conferee	Dissertation
1964	Shuch-shiang Huang	The biology of *Cactoblastis cactorum* (Berg) and Its Susceptibility to *Bacillus thuringiensis var. thuringiensis* Berliner
1964	Barton M. Matsumoto	Predator-prey Relationships between the Predator, *Cyrtorhinus fulvus* Knight, and the Prey, the Taro Leafhopper, *Tarophagus proserpina* (Kirkaldy)
1964	Romeo Lacson Dizon	Life History and Feeding Behavior of *Scymnus debilis* LeConte (Coleoptera: Coccinellidae)
1964	Francisco Martinez Laigo	Pathogen-Parasite Interaction in the Lawn Armyworm, *Spodoptera mauritia acronyctoides* (Guenée)
1964	Celso Garcia-Martell	Biology of *Liriomyza minutiseta* Frick (Diptera: Agromyzidae) in Hawaii
1964	Joel Rodriguez-Velez	Biology of the Greenhouse Thrips, *Heliothrips haemmorrhoidalis* (Bouché) (Thysanoptera: Thripidae) in Hawaii
1965	L. Lance Sholdt	The Pollination of the Coconut Palm, *Cocos nucifera* L., in Hawaii
1965	Ashok Kumar Raheja	The Interrelation between Two Insect Pathogens in the Lawn Armyworm, *Spodoptera mauritia acronyctoides* (Guenée) (Lepidoptera: Noctuidae)
1965	Elizabeth Ann Thomas Arthur (Kamran)	Some Biological and Ecological Studies on *Scaptomyza (Exalloscoptomyza)* spp. in Hawaii (Diptera: Drosophilidae)
1965	Visvalingam Kanapathippillai Ganesalingam	Some Environmental Factors Influencing Parasitization of the Eggs of *Nezara viridula* Linnaeus (Pentatomidae) by the Egg Parasite *Telenomus basalis* Wollaston (Hymenoptera: Scelionidae)
1965	Duane J. Gubler	Comparative Study of the Distribution and Periodicity of the Canine Filarial Worms *Dipetalonema reconditum* Grassi and *Dirofilaria immitis* Leidy in Hawaii
1965	Dely Pascual	The Effect of Several Organic Insecticides on Immature Stages of the Southern Green Stink Bug, *Nezara viridula* L.
1965	Aye Aye Khaing	Non-Thesis
1966	Satoru Miyazaki	Toxicity of Several Insecticides to the Southern Green Stink Bug, *Nezara viridula* L.
1966	Clinton Y. Kawanishi	A Comparative Study of Termite Embryology with Special Consideration of the Embryonic Development of *Cryptotermes brevis* (Walker) (Isoptera: Kalotermitidae)
1966	Belen D. Morallo	Toxicity and Anticholinesterase Activity of Four Organophosphorous Compounds to Four Species of Flies
1966	James K. Ikeda	Penetration as a Factor in the Differential Speed of Action of Chlorinated Hydrocarbon Insecticides in the German Cockroach

HONORARY DEGREES

In addition to the aforementioned degrees, one Honorary Master of Science and three Honorary Doctor of Science degrees have been awarded by the university to men who have made outstanding contributions to entomology in Hawaii. The M.S. degree was awarded Edward Macfarlane Ehrhorn in 1932 for contributions to science, primarily entomology and horticulture. The D.Sc. degrees were awarded Otto H. Swezey in 1944, Cyril Eugene Pemberton in 1951 and David Timmins Fullaway in 1962. These three men have distinguished themselves in the field of entomology in Hawaii, especially in forest entomology, biological control, plant quarantine and taxonomy.

SCHOLARSHIPS AND ASSISTANTSHIPS

National Science Undergraduate Scholarships, National Defense Education Act Fellowships for graduate students and one teaching and two research assistantships are available for qualified graduate students. The following people have been awarded the teaching assistantships: Ellery W. French, John W. Beardsley, Donald P. Wilton, Alden Dexter Hinckley, Donald Awai, David Lupton, Elizabeth A. McMahan, B. David Perkins, John Mellott, James K. Ikeda and Jack K. Fujii. The assistantships in research will be discussed in the History of the Hawaii Agricultural Experiment Station.

In addition, two privately endowed scholarships for students in entomology have been established in the department.

EDWARD MACFARLANE EHRHORN ENTOMOLOGICAL SCHOLARSHIP FUND

This fund was created in 1945 under provisions of the will of the late Jane Ehrhorn in memory of her husband, Edward Macfarlane Ehrhorn (Fig. 9). The income from the fund was to be used to create and maintain an educational scholarship for the purpose of assisting students in undergraduate or graduate entomological work.

Ehrhorn was born in San Francisco in 1862, educated in private schools in California and studied abroad in Hamburg, Germany (1871–1878), Grenchen, Switzerland (1878–1879), Brighton College, England (1879–1881) and Stanford University (1891–1892). Upon graduation from Stanford University (1892) he became Deputy Quarantine Officer for the California State Board of Agriculture in 1891. He was County Entomologist and Commissioner of Horticulture for Santa Clara County, California, from 1892 to 1904 when he was appointed the first Deputy State Commissioner of Horticulture and Horticulture Quarantine Officer at San Francisco. He held this position until 1909 when he accepted the position in Hawaii as Chief Plant Inspector and Superintendent of Entomology for the Territorial Board of Agriculture and Forestry. In 1916, plant quarantine was made a division separate from entomology,

Fig. 9. Edward Macfarlane Ehrhorn
(1862–1941)

and Ehrhorn was placed in charge of the organization until his retirement in 1926. After retirement he continued to serve in an advisory capacity as a consulting entomologist.

He became a member of the Hawaiian Entomological Society, 1 October 1909 and was its president from 1911–15 and vice president in 1935. While on the mainland, Ehrhorn was appointed to the Gypsy Moth Commission. He made several collecting trips into south-western U. S. and Mexico. His special interests were mealy bugs, scale insects, ants and termites. After retirement in 1926, he devoted several years to termite control, primarily serving the Honolulu business area. In 1934, he wrote a section in Kofoid's book, Termites and Termite Control, entitled, "Termites in Hawaii, Their Economic Significance and Control, and the Distribution of Termites by Commerce". Many papers by him on mealy bugs and scale insects were published. His annual address to the Hawaiian Entomological Society in 1916 was entitled, "Contributions to Knowledge of Dactylopiinae of Hawaii".

He also was keenly interested in horticulture and botany and produced many hybrid cannas, cactus and croton. He was interested in the Boy Scout movement and was president of the Honolulu Boy Scout Council in 1920 as well as being a merit badge counselor for zoology and insect life. The University of Hawaii conferred an Honorary Master of Science degree

on Ehrhorn in 1932 for his contributions to science. A portion of his library was donated to the university by his wife the same year.

The income from this fund is accumulated and used when necessary. The scholarship is not limited to students of the University of Hawaii since students wishing to continue their education in entomology at some other institution in the United States are considered. The annual income from the fund presently is about $400. The following students have received aid from this scholarship fund:

1953	Jit Singh Verma (gaduate student from India)	$500
1955	Minoru Tamashiro	$400
1956	Asher Ota (money was later refunded)	$250
1957	Donald Awai	$125
1959	Yasatileka Elikewela (undergraduate student from Ceylon)	$375
1962	Hachiro Harold Toba	$600
1963	L. Lance Sholdt	$600
1965	Eduardo Macion (graduate student from the Philippines)	$350
1965	Kingston Leong	$300

The total amount of aid from this fund utilized since its establishment is $3,250. The fund is administered by the Hawaiian Foundation, Hawaiian Trust Company.

ROBERT M. LOVELAND MEMORIAL SCHOLARSHIP

This scholarship was established by the Diversey Corporation (Hawaii), Limited, in 1965 to honor Robert Murray Loveland, who had been one of their outstanding young men. (Fig. 10)

Loveland moved to Hawaii with his parents from Bremerton, Washington when he was nine years old. He attended the University of Hawaii and received his Bachelor of Science degree in General Science in 1932. He continued his education and received the Master of Science degree in 1933. His thesis was entitled, "An Investigation of the Iodine Content of Some Hawaiian Food Products". About this time he took a special course in entomology and his interest never decreased. After graduation, he did research with several plantations and later with Hilts Laboratories. When Hilts went out of business a few years later, Loveland established his own company, United Chemical and Pest Control Services.

Shortly after the attack on Pearl Harbor on 7 December 1941, Loveland was employed in a laboratoy at Pearl Harbor where he worked on quality control inspection of rubber goods. In connection with his duties he travelled widely throughout the United States.

After the war, in 1947, he became a partner in the Kills 'Em Chemical Company and remained with the firm when it became the Diversey Corporation (Hawaii), Ltd. Loveland worked in all phases of the pest control and pesticide manufacturing business. He handled the technical and production departments for many years. At the time of his

Fig. 10. Robert Murray Loveland (1908–1965)

death in April, 1965, he was secretary of the company.

A charter member of the Hawaiian Pest Control Association, Loveland served as its president in 1963.

Amateur radio was a hobby he enjoyed for many years and he held several offices in the Hawaiian Amateur Radio Club. He was the only "ham" operator in Hawaii with two call signs, KH6CN in Honolulu and KH6SS at his summer home on the windward side of Oahu.

This memorial scholarship is to be granted annually to a junior or senior student in entomology. Criteria for granting the award are scholastic ability, interest in the humanities and financial need. The first recipient was Wayne Shishido, a senior student from Hilo, Hawaii.

CURRENT FACULTY

The present staff of the Universit's Department of Entomology (Fig. 11) at the main campus and at the Hawaii Agricultural Experiment Station, is made up of the following people who teach and conduct research in the field of entomology.

Dr. D. Elmo Hardy, Chairman, Senior Professor of Entomology and Senior Entomologist; Taxonomy of Diptera and Medical Entomology

Dr. Henry A. Bess, Senior Professor of Entomology and Senior Entomologist; Ecology, especially Population Dynamics and Biological Control

Dr. Martin Sherman, Professor of Entomology and Entomologist; Insect Toxicology and Economic Entomology

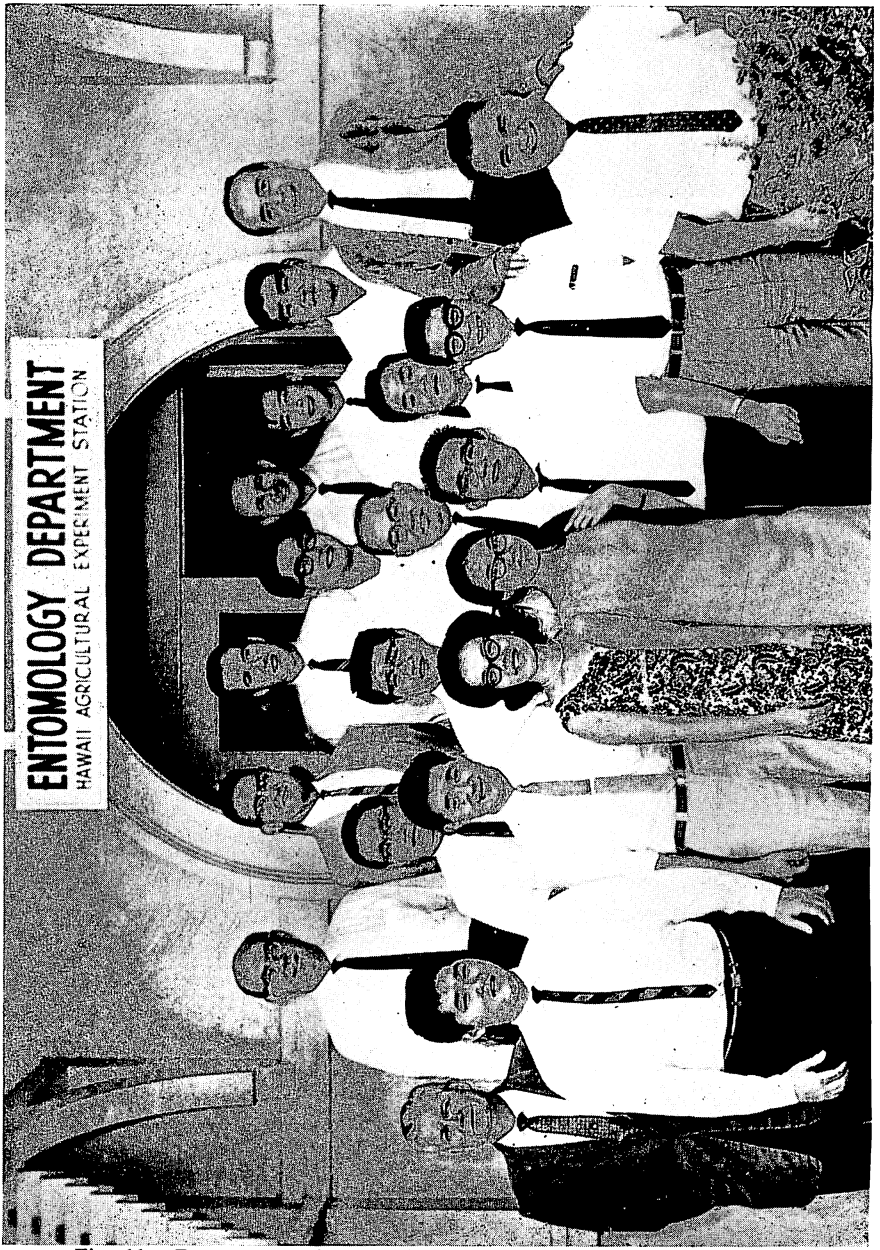

Fig. 11. Department of Entomology Staff, University of Hawaii, 1965

L.-R. Back row: LaPlante, Hardy (chairman), Sargent, Leong, Beardsley, Yates, Namba, Sherman. Center Row: Bess, Takei, Fujii, Nishida, Haramoto. Front Row: Park, Fujii, Uegawachi, Lee, Ikeda, Tamashiro, Mitchell. Members not present in photograph: Tuthill, Murphy, Kaneshiro, Chang, Kaya, Au and Oshiro.

Dr. Toshiyuki Nishida, Professor of Entomology and Entomologist; Insect Ecology, Ecology of Fruit Flies and Pollinators
Dr. Leonard D. Tuthill, Professor of Entomology (assigned to Zoology Dept.); Taxonomy of Psyllidae
Dr. Ryoji Namba, Associate Professor of Entomology and Associate Entomologist; Insect Transmission of Plant Diseases, Biology and Control of Insect Pests
Dr. John W. Beardsley, Associate Professor of Entomology and Associate Entomologist; Taxonomy of Scale Insects and Mealybugs, Biology, Sugar Cane Insects, Biological Control
Dr. Wallace C. Mitchell, Associate Professor of Entomology and Associate Entomologist; Economic Entomology, Biology, Attractants, Insect Control
Dr. Albert A. LaPlante, Associate Specialist in Entomology; Extension Entomologist
Dr. Minoru Tamashiro, Associate Professor of Entomology and Associate Entomologist; Insect Pathology, Biological Control and Economic Entomology
Dr. Frank H. Haramoto, Assistant Professor of Entomology and Assistant Entomologist; Acarology, Biological Control and Economic Entomology
Mr. Gerald H. Takei, Junior Entomologist; Research*
Mr. Jack K. Fujii, Assistant in Entomology; Teaching
Mr. Robert Park, Assistant in Entomology; Research
Mr. James Ikeda, Assistant in Entomology; Research and Teaching*
Mr. Kingston Leong, Assistant in Entomology; Research
Mr. Harry Kaya, Assistant in Entomology; Research
Mr. Milton Chang, Assistant in Entomology; Research*
Mr. Julian Yates, Assistant in Entomology; Research*
Mr. Warren Fujii, Assistant in Entomology; Research
Mr. David H. Sargent, Assistant in Entomology; Research
Miss Ora Mae M. Q. Lee, Assistant in Entomology; Research*
Mr. Kenneth Kaneshiro, Assistant in Entomology; Research*
Mrs. Eunice (David) Au, Assistant in Entomology; Research*
Mrs. Mildred E. (Harold S.) Uegawachi, Secretary
*Employed on a temporary contractual basis for research projects.

Our janitor, Yoshio Floyd Oshiro, is interested in entomology. He has collected many insects for the Bishop Museum in his travels throughout the Pacific islands, mainly Wake Island and Kwajalein Island. He was a professional collector of Lepidoptera for several years.

AFFILIATE GRADUATE FACULTY

In addition to the regular faculty the university has enlisted the service of members of cooperating institutions to serve on graduate committees. These men form the Affiliate Graduate Faculty in Entomology which was established in 1957.

NAME	INSTITUTION	SPECIALTY
Dr. J. Linsley Gressitt	Bernice P. Bishop Museum	Taxonomy
Dr. Charles R. Joyce	U.S. Public Health Service	Medical Entomology
Dr. Laurence C. Quate	B.P. Bishop Museum	Taxonomy
Dr. Carl M. Yoshimoto	B.P. Bishop Museum	Taxonomy
Dr. Nixon Wilson	B.P. Bishop Museum	Acarology
Mr. Kanjo Sakimura	Pineapple Research Institute	Taxonomy of thrips
Mr. Irving Keiser	U.S.D.A. Fruit Fly Laboratory	Fruit Flies
Mr. Loren F. Steiner	U.S.D.A. Fruit Fly Laboratory	Fruit Flies

Other men who have served on the Affiliate Graduate Faculty were K. Ito and Carl Schmidt of the Pineapple Research Institute and John

W. Balock and Arthur K. Burditt of the U. S. Department of Agriculture, Fruit Fly Laboratory.

VISITING SCHOLARS

Visiting professors have made valuable contributions to our teaching and research programs. Dr. Walter H. Wellhouse (Iowa State College) was here in 1950 and taught two undergraduate courses and conducted seminars. Dr. George W. Byers (University of Kansas), a taxonomist in Mecoptera, and Dr. Charles W. Rutschky (Pennsylvania State University), a morphologist, arrived in 1962. Dr. Rutschky remained for two years teaching insect morphology and doing research as a replacement for Dr. Namba who was in Thailand.

The first East-West Center Senior Specialist in Entomology was Dr. Ian W. B. Thornton (Hong Kong University) who arrived in 1963 to conduct research on the Psocoptera of Hawaii.

Dr. Blair Bartlett (University of California, Citrus Experiment Station, Riverside, California), a biological control specialist, and Dr. Freeman L. McEwen (Cornell University, Geneva Experiment Station), an insect-transmitted disease specialist, arrived in 1964. Dr. Bartlett attempted to determine the food requirements of parasites, especially *Opius oophilus* Fullaway. Dr. McEwen taught Insect Morphology and Insect-transmitted Disease of Plants for Dr. Namba whose tour of duty in Thailand was extended one year. Dr. Katherine Korboot (University of Queensland, Australia) conducted in 1964–65 a post-doctoral study on the insects introduced for the biological control of lantana.

FULLBRIGHT SCHOLARSHIPS

Fullbright scholarships and lectureships have been awarded the following staff members:

Name	Year	Country	Study
Henry A. Bess	1954–55	Ceylon	Relationships between Ants and Honey Producing Insects
	1960–61	Kenya, Africa	Interaction between Biological Control and Chemical Control of Coffee Insect Pests
Toshiyuki Nishida	1959–60	India	Ecological Study of Tephritid Fruit Flies of India
Martin Sherman	1956–57	Japan	Effect of Insecticide Formulation of Toxicity to Insects
	1966	Denmark	Study of the Comparative Toxicology of Organophosphorous Insecticides in Insect and Fowl
Leonard D. Tuthill	1950–51	New Zealand	Taxonomy and Ecology of the Psyllidae of New Zealand
	1958–59	Peru	Taxonomy and Ecology of the Psyllidae of Peru
	1965–66	Egypt	Lectureship in Systematic Entomology at the University of Cairo

RESEARCH GRANTS

In addition to the state and federal funds appropriated for instruction and research, monies secured from outside grants have aided the undergraduate and graduate programs in the department.

The National Science Foundation since 1950 has continued to support Dr. Hardy's grant for a study of the Diptera of Hawaii. Additional funds were awarded in 1954 and 1960 so that he could study type specimens of Hawaiian Diptera in museum collections in England and Austria. Three books have been published in this study. Dr. Hardy was awarded a fellowship by the Organization for European Economic Development for research in systematics at the University of Vienna, 1960–61.

Funds were granted to Dr. Bess by the NSF in 1958 for a study on insect population dynamics with special reference to the effect of host density on parasite and predator activity.

Continued support since 1960 has been given to Dr. Sherman by the Division of Environmental and Food Protection of the U. S. Public Health Service for his study on the metabolism and deposition of insecticides in fowl. It is a cooperative project with the Poultry Department.

The National Institutes of Health and National Science Foundation have granted funds to Dr. Hardy for the study of evolution and genetics of Hawaiian Drosophilidae. The study has been active since 1962 and is a cooperative venture between the University of Hawaii Department of Entomology and the University of Texas Genetics Foundation. The study is done mainly by visiting scientists who spend several months each year in Hawaii investigating speciation, cytogenetics, drosophila behavior, population genetics, evolution, and rearing. John P. Murphy of the University of Texas Genetics Foundation staff supervises the laboratories and handles the cultures throughout the year.

An international cooperative program between Japan and the United States has received continued support from the State Department and the National Science Foundation. Drs. Bess and Nishida represent the United States in this study on the biological control of Rice Stem Borers.

DEPARTMENT PUBLICATIONS

Many outstanding papers have been published by the staff. Dr. Hardy received an award for the outstanding publication of the year in 1958 from the State of Connecticut for his publication entitled, "Guide to the Insects of Connecticut, Part VI, Diptera or True Flies of Connecticut, Sixth Fasicle: March Flies-Bibionidae, State of Connecticut Geological and Natural History Survey Bulletin 87". The number of station papers published by the departmental staff since 1950 are given in Table 3.

Drs. Walter Carter and D. Elmo Hardy have published the books named in the list that follows Table 3.

Table 3. Station publications of Department of Entomology, University of Hawaii

Year	Bulletins	Tech. Papers	Misc. Papers	Books	Others	Total
1950	1	5			5	11
1951		8			1	9
1952		13			2	15
1953		8			4	12
1954	1	5			3	9
1955		10	1		5	16
1956		14			9	23
1957	1	4	3		8	16
1958		14			2	16
1959	1	7			1	9
1960		12	1	1		14
1961	1	11				12
1962		8	3	1	1	13
1963		7	4		5	16
1964		12	1	1	4	18
1965		9	3	1	2	15
Total	5	147	16	4	52	224

Walter Carter 1962 Insects in Relation to Plant Disease 705 pp.
Interscience Publishers, New York, New York

D. Elmo Hardy 1960 Insects of Hawaii, Volume 10 366 pp.
Diptera: Nematocera-Brachycera
Families: Tipulidae, Psychodidae, Culicidae, Chironomidae, Ceratopogonidae, Scatopsidae, Mycetophilidae, Sciaridae, Cecidomyiidae, Stratiomyiidae, Bombylidae, Scenopinidae and Empididae.
University of Hawaii Press, Honolulu, Hawaii.

1964 Insects of Hawaii, Volume 11 458 pp.
Diptera: Brachycera-Cyclorrhapha
Families: Dolichopodidae, Lonchopteridae,Phoridae, Pipunculidae and Syrphidae.
University of Hawaii Press, Honolulu, Hawaii.

1965 Insects of Hawaii, Volume 12 815 pp.
Diptera: Cyclorrhapha
Family: Drosophilidae
University of Hawaii Press, Honolulu, Hawaii.

CONSULTATIONS

Staff members are often called upon as consultants on a variety of entomological problems throughout the world. Local lumber dealers sponsored a trip to the Philippine Islands in 1953 for Dr. Bess to study the insects pests of Philippine lumber. The study was primarily concerned with insects attacking Philippine mahogany. Dr. Hardy traveled in the summer of 1957 to New Guinea to collect and study diptera under the auspices of the Bishop Museum. Dr. Nishida was a senior scientist, ecologist, for two years (1961–1963) with the Laboratory of Radiation Biology, University of Washington. The project was to study the effects of radio-

active fallout from the Bikini atomic blast on the ecosystem of the Marshall Islands. He resigned from the research committee in 1963 to devote more time to his project with Japan on international biological control of insect pests of rice.

Dr. Tamashiro was a consultant for the United Nations World Health Organization, Geneva, Switzerland, Section on Environmental Biology, Division of Environmental Health. He made a trip to Aitutaki, Cook Islands in September, 1963 to study the basic larval ecology of the local vector of filariasis, *Aedes polynesiensis*, and to make recommendations on the possibility of biological control.

Dr. Namba taught entomology and conducted research programs for three years (1962–1965) as a part of the research team in the cooperative agreement with the University of Hawaii, U. S. Department of State and the Royal Thailand government at Kasetsart University, Bangkok. He worked with the Thailand entomologists and traveled widely in the country. Greenhouses were built for a research program in insect disease transmission and over 50,000 insect specimens were collected and identified.

EXTENSION SERVICE

Extension work at the College of Hawaii (UH) was initiated in 1908 with the founding of the university. The programs were financed by funds appropriated by the Territorial legislature. Work was done by the college staff without additional compensation. The object of the extension program was to serve the persons unable to attend regular class sessions of the college or other established institutions. At this time, much of the extension work assumed by mainland colleges was carried on in Hawaii by the Federal Agricultural Experiment Station, Hawaiian Sugar Planter's Association, Territorial Board of Agriculture and Forestry, Territorial Board of Health and other governmental agencies. Although the federal extension division was organized in 1914, benefits from the Smith-Lever Act were not obtained for Hawaii until 1928.

A number of short courses in entomology were conducted by county agents, who had some training in entomology, or outside specialists. The first full-time position as Extension Specialist in Entomology was established in September, 1965. Dr. Albert A. LaPlante was appointed to this position.

In 1908 and 1909 Economic Entomology was one of the subjects discussed in a series of twenty-six evening lectures. Correspondence courses were offered by the extension service in Practical Horticulture and Zoology. Insects and their control were discussed in these courses.

Professor Severin gave a lecture on "Methods of Insect Study" in a short course offered for teachers in March, 1912. A number of exhibits at fairs, etc. sponsored by the extension service included entomological collections.

In 1914, Professor Vaughan MacCaughey reported extension work was being carried on in twenty-seven different projects from travelling libraries to special work in insect identification. A correspondence course in elementary entomology was offered. Extension service work in entomology included identification of harmful and beneficial insects, articles for the press, practical assistance in combatting pests and special instruction in tree surgery and spraying.

A special short course for plantation men was sponsored jointly by the College of Hawaii and the Hawaii Sugar Planter's Association in 1919. Drs. Swezey and Pemberton discussed insect pests of sugar cane and their control, leafhoppers, anomala beetle, sugarcane borer, armyworms and miscellaneous insects.

Because of the increased interest in apiculture an extension short course in bee culture was taught by E. C. Smith in 1921. David L. Crawford, Professor of Entomology, was the Director of Extension from 1921–26.

With the development of "Victory Gardens" during Worid War II in the backyards of homes, information on vegetable and fruit insect control was needed. A number of extension circulars and bulletins were published on control of various garden insect pests from 1942 to 1948 by County Extension Agents George E. Marvin, Ashley C. Browne and Benjamin A. Tower. Extension bulletins on "Plant, Poultry and Livestock Pests and Their Control" and "Household Pests", by Drs. Bess, Sherman and Mitchell were published in 1952 and 1953.

Various staff members of the Hawaii Agricultural Experiment Station have conducted extension courses in entomology for specific groups. Drs. Bess and Sherman taught "Household Pests and Their Control" to pest control operators in 1952. Two years later Dr. Sherman taught "Insects and Their Control" which was designed to help the home gardener as well as the farmer. A similar course was offered in 1956 but interest was not enough to warrant giving give the course although it was advertised in the extension bulletin of adult classes.

Staff members have contributed from time to time by giving talks to many groups on a variety of entomological subjects.

ACKNOWLEDGMENTS

I would especially like to thank Miss Melva Miyasato, secretary for the University of Hawaii Board of Regents, who aided greatly in securing information from the many volumes of minutes of their meetings. Photographs of the entomologists were obtained from Dr. Cyril E. Pemberton (H.S.P.A.), University of Hawaii, United States National Archives and Records Services, Diversey Corporation, Robert H. Ehrhorn, and Glenn L. Finney. My thanks also go to the many individuals who suggested sources of information and related personal experiences with many of the men mentioned in this paper.

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